

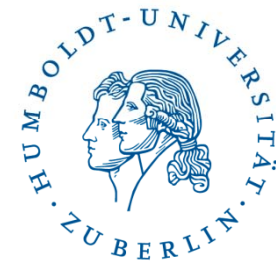
# INTEGRATIVE RESEARCH INSTITUTE FOR THE SCIENCES

## IRIS ADLERSHOF



Opening July 12<sup>th</sup>, 2010

Jürgen P. Rabe



# IRIS ADLERSHOF in a Nutshell

- **Integrative Research Institute**  
with physicists, chemists, mathematicians and computer scientists
- **Excellent research facilities, including OPEN Access Labs (OPALs)**
- **Elements of an Institute for Advanced Studies**
- **Graduate and postgraduate education programs**
- **Integrated into the university, but open to strategic partners**



# Why ...

## *... integrative?*

**Scientific challenges** do not care about scientific disciplines ...

and **borders** cannot be fully understood by looking at them from one side only

## *... elements of an Institute for Advanced Studies?*

Major challenges require **time & freedom**

## *... OPen Access Labs?*

**Cooperation** with other research institutes

Quick recognition of potential for **applications** with innovative enterprises

## *... integrated within a university?*

**Openness** through easy and flexible links to a **broad range of disciplines**

**Sustainability through education** of students, young researchers, teacher trainees

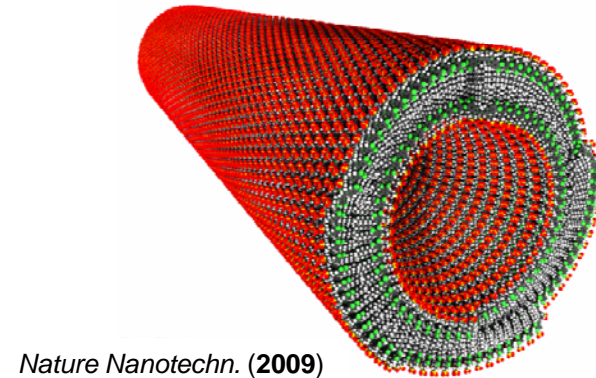
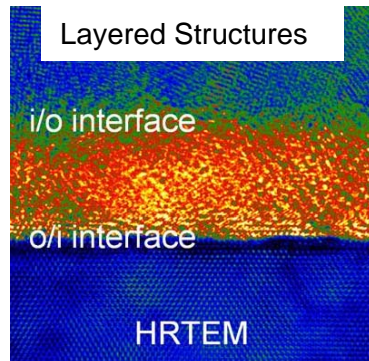
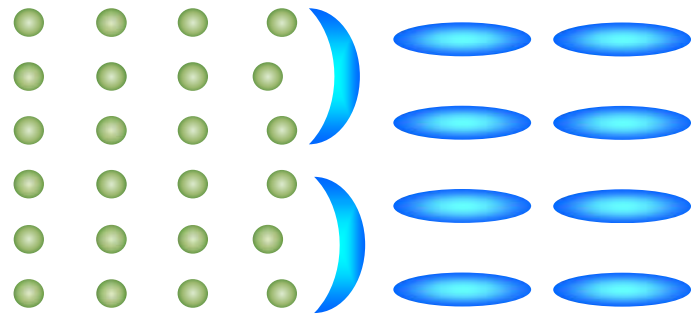
# Driving Forces: Human Curiosity & Global Challenges

**Q:** How to describe the world at extremely short and extremely long length and time scales, and in well defined yet complex systems?

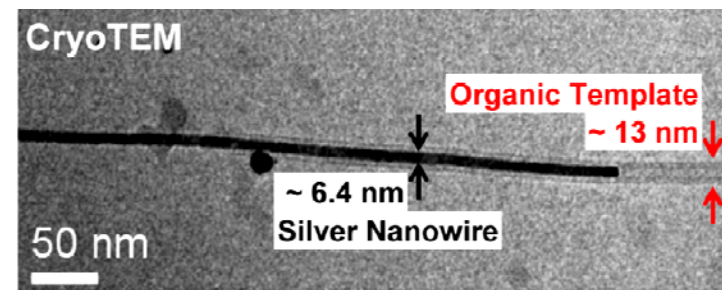
**Q:** How to develop extremely efficient optically, electronically, and chemically active systems and processes in order to cope with limited natural resources?

Coin with Janus Head, ca. 220

# Hybrid Inorganic-Organic Systems for Optics and Electronics



*Nature Nanotechn.* (2009)

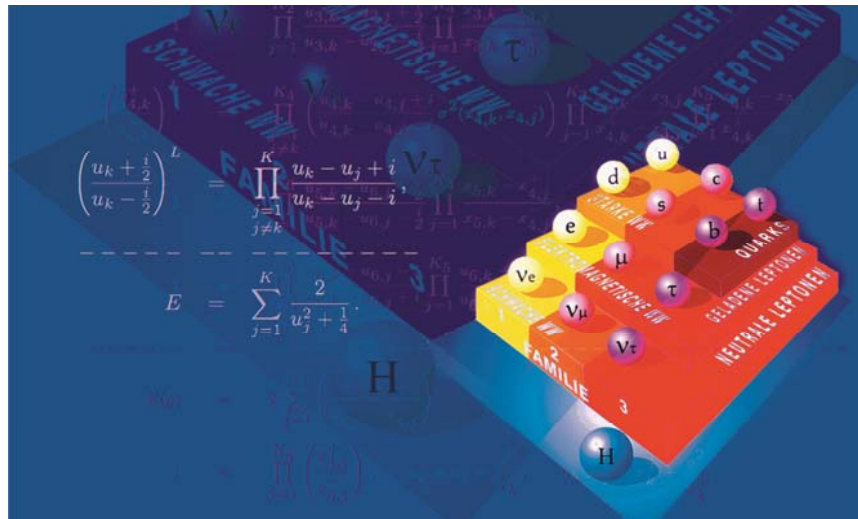


*J. Am. Chem. Soc.* (2010)

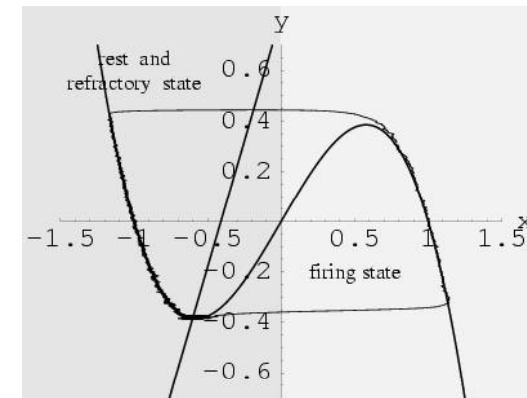
- Bridge-Professors between Physics and Chemistry: *N. Koch & N.N.*
- OPen Access Lab (OPAL) for Advanced Materials
- Humboldt Center for Modern Optics & Center for Structural Research (*planned*)

# Mathematics and Fundamental Physics

## Supersymmetric Quantum Field Theory



## Non-linear Dynamics in Complex Systems

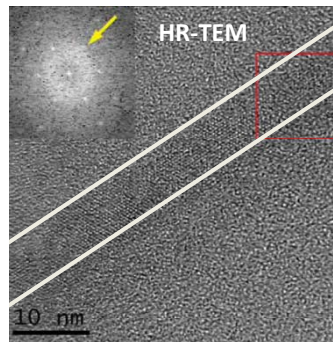


- Bridge-Professor between Mathematics and Physics: *M. Staudacher*
- Alexander von Humboldt-Professor *D. Kreimer*
- Interdisciplinary Center for Mathematical Physics (*planned*)

# Competences

## Structural Science

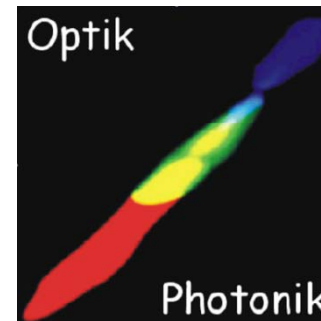
Microscopy vs. Scattering



Coop:  
HZB,  
IKZ,  
BAM,  
...

## Modern Optics

Analysis of Processes & Optical Technologies



Coop:  
MBI,  
FBH,  
WIAS,  
...

## Mathematical Physics

Quantum Field Theories & Complex Dynamics

$$\left( \frac{u_k + \frac{i}{2}}{u_k - \frac{i}{2}} \right)^L = \prod_{\substack{j=1 \\ j \neq k}}^K \frac{u_k - u_j + i}{u_k - u_j - i},$$

---

$$E = \sum_{j=1}^K \frac{2}{u_j^2 + \frac{1}{4}}.$$

Coop:  
AEI,  
DESY,  
...

## Computational Sciences

Simulation of Real Systems

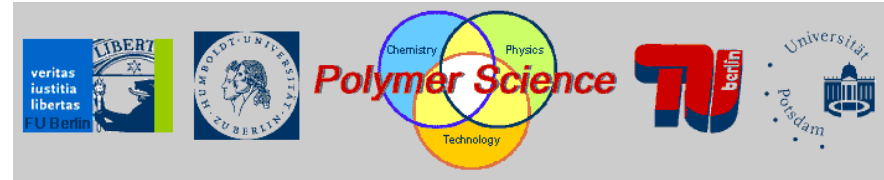


Coop:  
WIAS,  
FIRST,  
...

# Graduate and Postgraduate Education: Sustainability & Internationalization

## Master Programs

- Polymer Science (with FU, TU & UP)



## Graduate Schools

- IMPRS (with FHI and MPI-KG)
- IGRTG (with TU)
- Sfb 658 & Sfb 765 (with FU)



## ProMINT-Kolleg



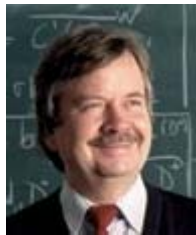
## Current Initiatives

- Graduate School on Structural Science (with HZB)
- International Summer School Program

# Founding Members



O. Benson  
Physics



J. Brüning  
Mathematics



J.C. Freytag  
Computer Science



S. Hecht  
Chemistry



F. Henneberger  
Physics



J. Kramer  
Mathematics



J.P. Rabe  
Physics

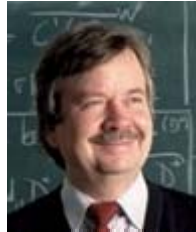


J. Sauer  
Chemistry

# Current Members



O. Benson



J. Brüning



J.C. Freytag



S. Hecht



D. A. Vanden Bout



S. Blumstengel



N. Puhmann



F. Henneberger



J. Kramer



J.P. Rabe



J. Sauer



E. List



D.M. Eisele



M. Sae-Chew



N. Koch



M. Ballauff



T. Elsaesser



A. Reinefeld



F. Della Sala



M. Barth



M. Dorn

# IRIS ADLERSHOF Integrates

... within the Sciences

... between University and Extra-University Research

... between the Sciences and Innovative Enterprises

... here

